

ARGUMENTS/REMARKS

Claim 15 has been withdrawn. Claims 2-3, 9, 17 and 20-22 have been canceled. Claims 1, 4, 16, and 18 have been amended. Claims 1, 4-8, 10-14, 16, and 18-19 are pending.

The office action rejected claims 2 and 10-14 under 35 U.S.C. 103(a) as being unpatentable over Chantre et al. (US 2001/0051413 A1) in view of Vallon et al (JVST A 1997) and Chen (EP 0200951 A2). It is believed that the Examiner meant claim 1 instead of claim 2, since claim 2 has been canceled, and the Examiner did not discuss claim 1. Claim 1 has been amended to incorporate the main etch of claim 3 into claim 1, and claim 3 has been canceled. Claim 1 has also been amended to clarify that the break through etch of the polysilicon precedes the polysilicon main etch, which precedes the silicon germanium etch. Claim 1 also has been amended to recite that the polysilicon main etch etches the polysilicon completely through to the silicon germanium layer. For at least these reasons, claim 1 is not made obvious by Chantre et al. in view of Vallon et al. and Chen.

The office action rejected claims 3-9 under 35 U.S.C. 103(a) as being unpatentable over Chantre et al. (US 2001/0051413 A1) in view of Vallon et al (JVST A 1997), Chen (EP 0200951 A2), and Yang et al. (US 6,451,647 B1). As mentioned above, claim 1 has been amended to incorporate the limitations of claim 3, and further recite that the break through etch simultaneously etches doped and undoped regions, and that the polysilicon main etch etches the polysilicon layer completely through to the silicon germanium layer.

Although Chen may teach an etch chemistry of N₂, SF₆, and CHF₃ to etch a polysilicon layer, this reference does not teach or suggest that such a break through etch would be able to simultaneously etch doped and undoped regions of a polysilicon layer. Page 4, lines 15-21, of the application states that etching doped and undoped regions simultaneously causes additional difficulties, since the doped and undoped regions have different etch characteristics that can cause undercutting or a non-vertical profile in one of the regions. Chen does not disclose that an etch with N₂, SF₆, and CHF₃ would be successful in simultaneously etching doped and undoped regions of a polysilicon layer. Such a combination is not predictable, since in plasma processing various outcomes are unpredictable.

In addition, it would not be obvious to combine the etch chemistry cited in the office action from col. 11, lines 20-22, 32-33, and col. 14, lines 7-10, of Yang with the teaching of Chantre, Vallon, and Chen to obtain the combination of the break through etch that simultaneously etches doped and undoped polysilicon regions, the main etch that etches completely through the polysilicon layer to the silicon germanium layer, and the silicon germanium etch, as recited in claim 1, as amended. The office action failed to point out anything in these references that teach a separate break through etch. In addition, the cited portion of Yang teaches that the etch process is able to equally etch through polysilicon and SiGe, therefore there is no motivation for using this step in a process with a separate SiGe step with a different etch chemistry. For at least these reasons, claim 1, as amended, is allowable.

The office action rejected claim 16 under 35 U.S.C. 103(a) as being unpatentable over Chen (EP 0200951 A2) in view of Nallan et al (WO 00/04213). Claim 16 has been amended to recited simultaneously etching the at least one doped region and at least one undoped region and to incorporate the limitations of claim 17, which has been canceled. For at least these reasons, claim 16, as amended, is not made obvious by Chen in view of Nallan.

The office action rejected claims 17-19 under 35 U.S.C. 103(a) as being unpatentable over Chen (EP 0200951 A2) in view of Nallan et al (WO 00/04213) and Yang et al. (US 6,451,647 B1). Claim 16 has been amended to recited simultaneously etching the at least one doped region and at least one undoped region and to incorporate the limitations of claim 17, which has been canceled. The cited art does not disclose or make obvious the specific combination of two different etches of a polysilicon layer with a doped region and an undoped region, as recited in claim 16, as amended. Chen, in col. 2, lines 1-5, teaches that the etch of Chen is for etching multiple silicon layers having different doping characteristics. This would teach away from having a different etch chemistry to further etch a polysilicon layer, as recited in claim 16, as amended.

In addition, as discussed above regarding claim 1, although Chen may teach an etch chemistry of N₂, SF₆, and CHF₃ to etch a polysilicon layer, this reference does not teach or suggest that such a break through etch would be able to simultaneously etch doped and undoped regions of a polysilicon layer. Page 4, lines 15-21, of the application states that etching doped and undoped regions simultaneously causes additional difficulties, since the doped and undoped regions have different etch characteristics than can cause undercutting or a non-vertical profile in one of the regions. Chen does not disclose that an etch with N₂, SF₆, and CHF₃ would be

successful in simultaneously etching doped and undoped regions of a polysilicon layer. Such a combination is not predictable, since in plasma processing various outcomes are unpredictable. So it is not obvious that the chemistry of Chen would successfully etch in the process of Nallan, so that it would not be obvious to combine these references. For at least these reasons, claim 16, as amended, is not made obvious by the cited references.

Dependent claims 4-8, 10-14, and 18-19 are also patentably distinct from the cited references for at least the same reasons as those recited above for the independent claims, upon which they ultimately depend. These dependent claims recite additional limitations that further distinguish these dependent claims from the cited references.

For example, claim 5 recites that the stack further comprises a seed silicon layer under the silicon germanium layer, where the SiGe etch etches through the seed layer. The office action failed to point out anything that etches both the SiGe layer and the seed layer. For at least these reasons, the dependent claims are not made obvious by the cited references.

Applicants believe that all pending claims are allowable and respectfully request a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at telephone number (408) 255-8001.

Respectfully submitted,
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